

# SYSTEM AND METHOD OF PARALLEL LOADFLOW CALCULATION FOR ELECTRICAL POWER SYSTEM

## ABSTRACT

A method of performing loadflow calculations for controlling voltages and power flow in a power network by reading on-line data of given/specified/scheduled/set network variables/parameters and using control means, so that no component of the power network is overloaded as well as there is no over/under voltage at any nodes in the network following a small or large disturbances. A loadflow calculation method could be any method including invented Gauss-Seidel-Patel Loadflow (GSPL) and Decoupled Gauss-Seidel-Patel Loadflow (DGSPL) methods involving self-iteration over a node within global iteration over n-nodes in n-node power network. The loadflow calculation is characterized in 1) the use of a network decomposition technique referred to as Suresh's diakoptics that determines a sub-network for each node involving directly connected nodes referred to as level-1 nodes and their directly connected nodes referred to as level-2 nodes and so on, wherein the level of outward connectivity for local solution of a sub-network around a given node is to be determined experimentally; 2) the use parallel solution of all sub-networks using available solution estimate at the start of the iteration without intermediate updating of solution estimate, and **because a node could be directly connected to two or more nodes or a part of two or more sub-networks emanating from different nodes, a parallel solution iteration involves adding and taking the average of all the solution estimates or corrections obtained for a node in the parallel solution of sub-networks emanating from different nodes;** 3) the use of available parallel computer or invented simplified parallel computer a server-processor and parallel-processors architecture, where each of the parallel processors communicate only with server processor and commonly shared memory locations and not among themselves.